-REMARKS-

This Amendment is responsive to an Official Action that issued in this case on April 9, 2002. In that Action, the finally rejected claims 1-7 and 22-25 under 35 USC §103 as being obvious in view of several references. Furthermore, the Examiner objected to the disclosure for formal reasons.

Reconsideration of this case is respectfully requested in view of the following remarks.

Applicant's Invention

An integrated circuit is designed and fabricated with contemporary processing technologies, except that certain devices, referred to in the specification as "safeguard devices," are added to the integrated circuit. The safeguard devices are fabricated so that they, and not the other devices (referred to as "utile devices" in the specification) on the integrated circuit, are susceptible to ionizing radiation. The safeguard devices are coupled into the integrated circuit in such a manner that when the integrated circuit is bombarded with ionizing radiation, the safeguard devices irreparably destroy (at least in some embodiments) the functionality of the integrated circuit.

Independent claim 1 recites a "first device" and a "second device" that are electrically connected to one another, and further recites that:

> the effective threshold voltage of said first device is more susceptible to be lowered by ionizing radiation than is the effective threshold voltage of said second device.

Since the effective threshold voltage of the first device is more susceptible to being lowered by ionizing radiation than is the effective threshold voltage of the second device, the first device functions as a "safeguard device" and the second device is a "utile device." The electrical connection between the first device and the second device enables the first device to affect the operation of the second device (*e.g.*, irreparably damaging the integrated circuit, *etc.*) and, indeed, the whole circuit.

To the same affect, independent claim 22 recites a "safeguard" device and a "utile" device that are electrically connected to one another, and further recites that:

> upon exposure to a sufficient amount of ionizing radiation, said safeguard device turns on before said utile device, and affects operation of said utile device.

The Claims are Allowable
Over the Art of Record

The Office rejected claims 1-2, 4-7 and 22-25 under 35 USC §103 over U.S. Pat. No. 5,589,708 to Kalnitsky or U.S. Pat. No. 5,748,412 to Murdock et al in view of admitted prior art ("APA"). Neither of these patents, either alone or in combination with APA, disclose nor suggest applicant's claimed invention.

-Kalnitsky-

Kalnitsky discloses that a "dosimeter" can be created within an integrated circuit by forming radiation hard transistors as well as standard transistors in the same integrated circuit. Kalnitsky proposes locating a sensor on the chip that can determine any differences between the performance of the two types of transistors, thereby sensing any accumulated radiation dose. According to Kalnitsky, a "self-adapting" circuit that responds to the sensor could be used to compensate for loss in performance due to the ionizing radiation.

Kalnitsky does not disclose electrically connecting the radiation-hard transistors and the standard transistors, as required by independent claims 1 and 22. But the Examiner argues that because the APA teaches electrically connecting two devices to one another, it would obvious for one skilled in the art to connect the radiation-hard and standard transistors of Kalnitsky to one another.

In applicant's invention, radiation-*soft* circuit elements are produced and electrically incorporated into an integrated circuit to sabotage the operation of an integrated circuit on exposure to ionizing radiation. Kalnitsky, on the other hand, modifies procedures to produce dose-*hard* transistors to keep an integrated circuit properly functioning (*i.e.*, include a sensor and a self-adapting circuit to compensate for loss of performance). If the dose-hard transistors were connected to the standard transistors, then the difference in performance of the transistors, on exposure to ionizing radiation, could not be detected. No one skilled in the art would modify Kalnitsky as the Examiner suggests.

Nor does Kalnitsky disclose, as is required by claim 22, that upon exposure to a sufficient amount of ionizing radiation, the safeguard device turns on before the utile device, and "affects operation" of the utile device. But the Examiner's response to this is that since it is inherent that radiation soft and hard devices turn on before and after regular devices, respectively, they naturally affect the operation of a second device connected thereto. Again, there would be no reason for one skilled in the art to connect dose-hard transistors to standard transistors in the circuit of Kalnitsky. In fact, as previously suggested, there is good reason not to make such an electrical connection.

-Murdock-

Murdock discloses a method and apparatus for protecting magnetoresistive sensor elements from electrostatic discharge. The apparatus includes a magnetoresistive sensor, detection circuitry, and "reader" conductors that are located between the two. A diode assembly interconnects the reader conductors. The diode assembly incorporates "soft" diodes that might conduct at a voltage that is less than the operating voltage of the magnetoresistive sensor. The diode assembly has a resistance that prevents electrical conduction across the diode assembly between the reader conductors when the voltage between the reader conductors is less than or equal to an operating voltage of the magnetoresistive sensor. When the voltage between the reader conductors is greater than a pre-selected protection voltage threshold (based on the sensivity of the magnetoresistive sensor to electrostatic discharge), the diode assembly shunts current across the diode assembly between the reader conductors thereby "short circuiting" the reader conductors to protect the magnetorestrictive sensor.

The Examiner asserts that while Murdock does not teach the claimed electrical connection, this is again shown by the APA. Furthermore, the Examiner alleges that "Murdock teaches soft diodes having lower threshold voltage. Therefore, the threshold voltage of the soft diodes of Murdock is more susceptible to be lowered by ionizing radiation than a non-soft diode."

The use of the word "therefore" at the beginning of the second sentence suggests that the conclusion stated in the second sentence follows from the content of the first sentence. But it doesn't. The fact that Murdock's soft diodes conduct at a lower voltage than a magnetoresistive sensor has nothing to do with whether or not the threshold voltage of a soft diode is more susceptible to being lowered by ionizing radiation than that of a magnetoresistive sensor. (It is noted that the relevant inquiry is the susceptibility of the "soft" diode to ionizing radiation relative to that of a mangetoresistive sensor, not relative to a non-soft diode.)

The term "soft diode," as used by Murdock, has nothing to do with a diode's response to ionizing radiation. It's simply the term used by Murdock to indicate a diode that might "conduct at less than the operating voltage, V_o, of magnetoresistive sensor element 34." There is no indication that Murdock's soft diodes have an effective threshold voltage that is more susceptible to be lowered by ionizing radiation than is the effective threshold voltage of a second device (in Murdock's case - a magnetoresistive sensor), as required by claim 1.

Nor, with reference to the limitations of claim 22, is there any indication that Murdock's soft diodes turn on before the magnetoresistive sensor upon exposure to a sufficient amount of ionizing radiation. In other words, a soft diode's proclivity to conduct at

a lower voltage than the magnetoresistive sensor says nothing about it's behavior, relative to the magnetoresistive sensor, on exposure to ionizing radiation.

All Structural Detail that is
Essential for a Proper
Understanding of the Invention
is Shown in the Drawings

The Office objected to the Drawings alleging that they fail to show "a first device comprising a field oxide region including a material that traps positive charge and a second device not been implanted with that material."

The illustrative embodiment of the invention pertains to using dose-soft devices to sabotage the operation of a circuit. What's essential in the case are drawings such as FIGs. 3 and 4, which depict the electrical connection between safeguard devices and utile devices to create a circuit having increased susceptibility to ionizing radiation.

Those skilled in the art know how to make dose-soft devices. And the applicant provides reference to some of its own pending patent applications on the subject. Providing another Figure that shows one device with "damage centers that trap positive charges" connected to another device that doesn't have such damage centers does not add anything of merit or value to this application or otherwise aid one skilled in the art in understanding this invention. This case is not about creating dose soft devices. It's about using dose soft devices in a novel and non-obvious way (*i.e.*, integrating them into a circuit such that the resistance of the circuit to ionizing radiation is negatively affected).

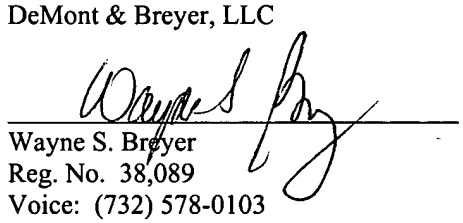
Consequently, the Office is requested to withdraw its objection to the drawings.

Conclusion

It is believed that the pending claims are allowable. Consequently, a notice to that effect is solicited.

Respectfully,

DeMont & Breyer, LLC



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